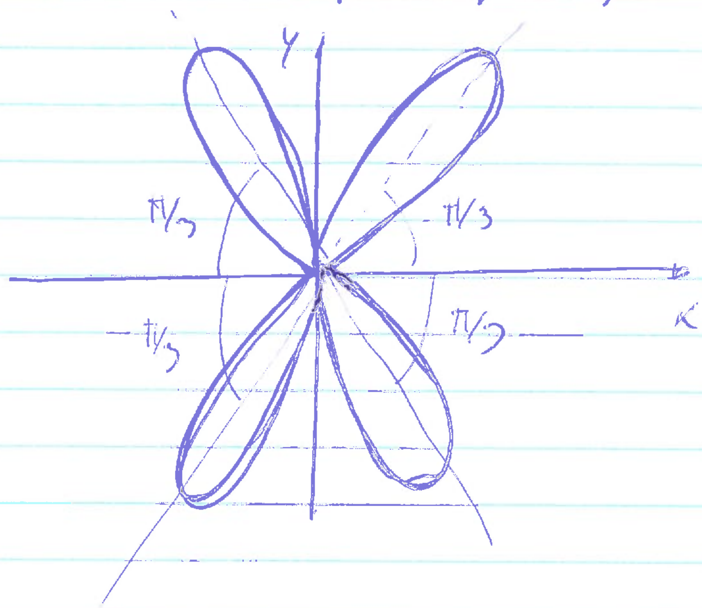
Proposed solutions $\boxed{8b}$

1) $R_{rad} \simeq 316\ m\Omega$

2) $\bar{S}h_{max} = 2{,}5\ mW/m^2$

3) $RP \propto \cos^2(\pi\cos\varphi - \pi/2)$



4) $d = \lambda/4 \qquad \alpha = \pi/2$

5) $\check{E}_{total} = \frac{jZ I_{01} dk}{4\pi r_1} e^{-jkr_1} \vec{a}_\theta + \frac{jZ I_0 dk}{4\pi r} e^{-jkr} \vec{a}_\theta + \frac{jZ I_{02} dk}{4\pi r_2} e^{-jkr_2}$

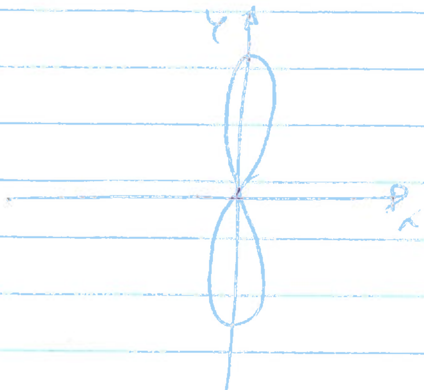
$r_1 = r - d\cos\varphi \qquad r_2 = r + d\cos\varphi$

$$\boxed{\check{E}_{total} = \frac{jZ I_0 dk}{4\pi r} e^{-jkr}\left(e^{+j(kd\cos\varphi + j\alpha_1} + 1 + e^{-jkd\cos\varphi - j\alpha_2}\right)}$$

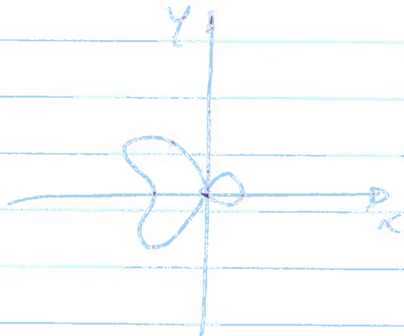
$$\boxed{\check{E}_{total} = \frac{jZ I_0 dk}{4\pi r} e^{-jkr}\left(2\cos(kd\cos\varphi + \alpha) + 1\right)}$$ $\rightarrow$ if $-\alpha_1 = \alpha_2 = \alpha$

$$\bar{S}_b = \frac{Z^2 I_0^2 d^2 k^2}{32\pi^2 r^2} \left(2\cos(kd\cos\varphi + \alpha) + 1\right)^2$$

$d = \lambda/2 \quad \alpha = 0$



$d = \lambda/2 \quad \alpha = \pi/2$



etc...

The array factor formula is not applicable. The geometry of validity is not the one of this exercise.